

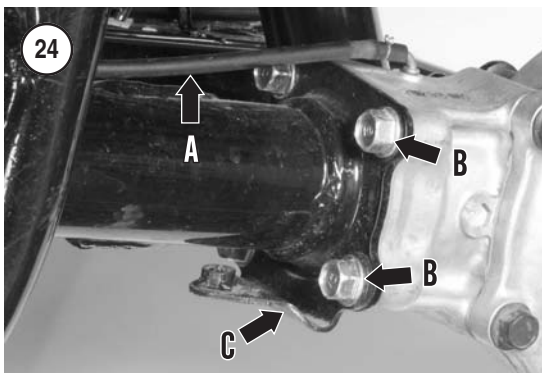
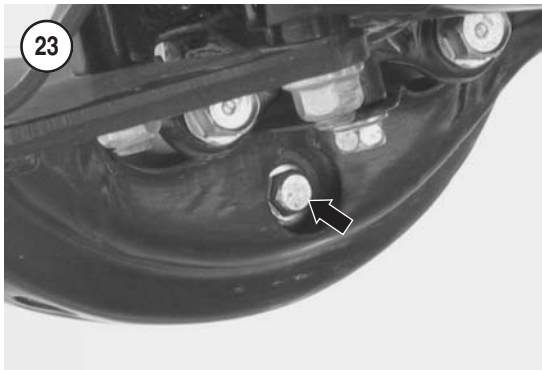
14. Tighten the right side axle nut (B, **Figure 20**) to 137 N•m (101 ft.-lb.).

#### WARNING

Always install a new cotter pin. If the cotter pin hole(s) in the axle does not align with the castellations on the nut, tighten the nut further until hole alignment is correct. Never loosen the axle nut to achieve hole alignment.

15. Secure each axle nut with a new cotter pin. Spread the cotter pin ends to lock it in place. See **Figure 22**.

16. Install both rear wheels as described in this chapter.



## FINAL DRIVE UNIT

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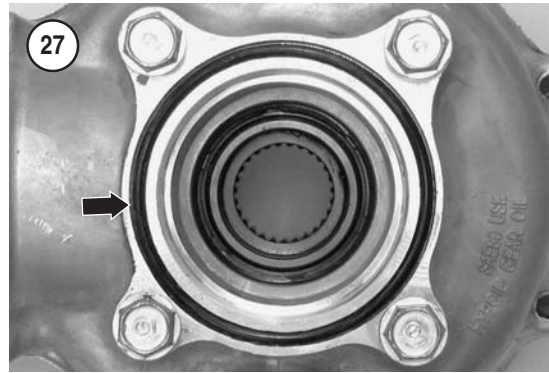
### Removal

1. Remove the drain bolt (**Figure 23**) and drain the final drive oil.
2. Remove the rear axle as described in this chapter.
3. Disconnect the vent hose (A, **Figure 24**) from the final drive housing tube.
4. Remove the right axle housing bolts (**Figure 25**).

#### NOTE

The lower final drive housing retaining bolts also secure the skid plate bracket.

5. Remove the final drive housing bolts (B, **Figure 24**) and skid plate bracket (C).
6. Remove the final drive unit.



7. Remove the spring (**Figure 26**) from the driveshaft.
8. Remove the O-rings from the front and sides of the final drive housing.
9. Refer to *Disassembly, Inspection and Assembly* for further information.

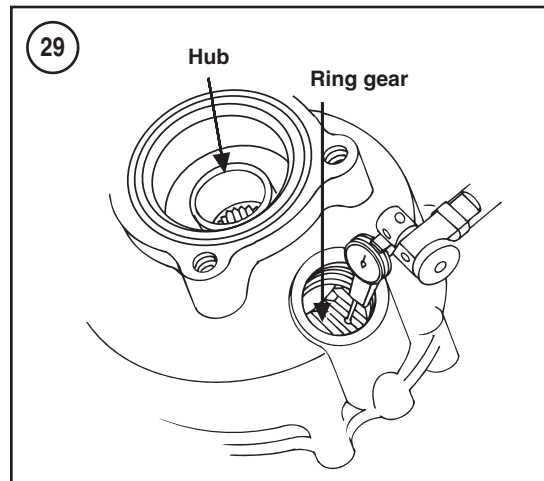
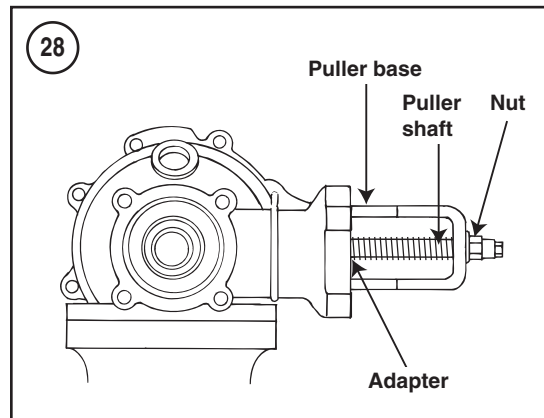
### Installation

1. Lubricate new O-rings with grease and install them into the grooves at the front and sides of the final drive housing (**Figure 27**).
2. Lubricate the spring with grease and install it into the end of the driveshaft (**Figure 26**).
3. Lubricate the shaft splines with molybdenum disulfide grease.

#### NOTE

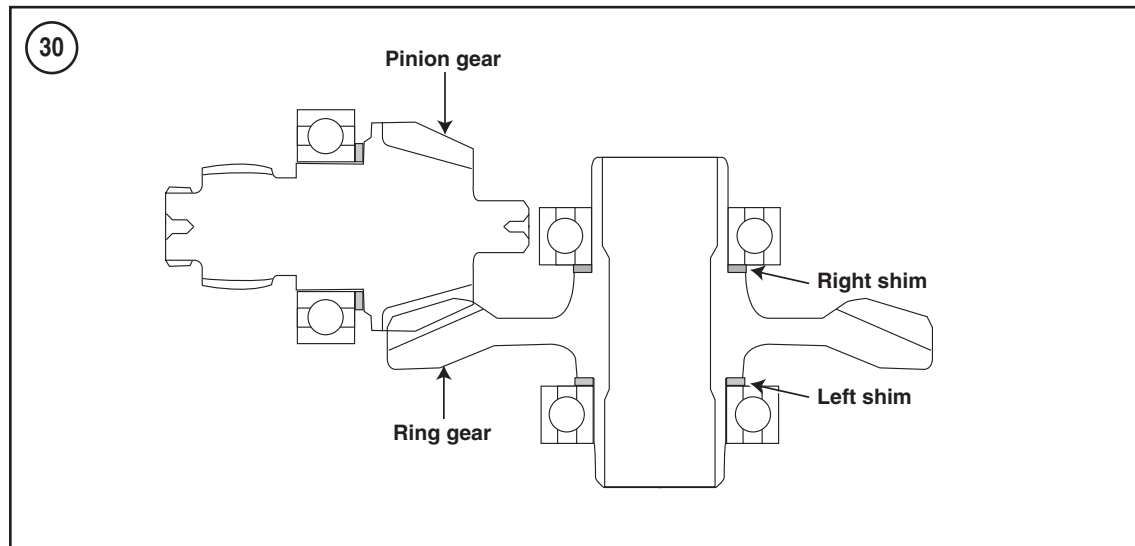
*Make sure the driveshaft is properly engaged in the universal joint in the swing arm.*

4. Install the final drive unit onto the swing arm, making sure the pinion shaft engages the driveshaft and spring.
5. Install the front bolts (B, **Figure 24**) and skid plate bracket (C). Tighten the bolts to 54 N•m (40 ft.-lb.).
6. Install the side bolts (**Figure 25**). Tighten the bolts to 54 N•m (40 ft.-lb.).
7. Reconnect the vent hose (A, **Figure 24**) to the vent tube.
8. Install the rear axle as described in this chapter.
9. Refill the final drive unit with the recommended type and quantity of oil as described in Chapter Three.



### Backlash Measurement/Adjustment

Perform gear backlash measurement prior to disassembly to determine gear wear and whether the internal shim thicknesses must be adjusted. Measuring gear backlash is also necessary after overhaul.



1. Install the pinion puller base, puller shaft, adapter and special nut as shown in **Figure 28** so any pinion end play is removed and the pinion cannot rotate.
2. Place the final drive in a soft-jawed vise.
3. Remove the oil fill cap.
4. Insert a tool into the center splines of the ring gear hub so the ring gear can be rotated.
5. Position a dial indicator so the tip rests against a gear tooth (**Figure 29**).
6. To determine the gear backlash, gently rotate the ring gear while reading the dial indicator. Refer to **Table 1** for the specified backlash.
7. Remove the dial indicator, then rotate the ring gear and take two additional backlash readings 120° from the original measuring point. If the difference between any two readings exceeds 0.2 mm (0.01 in.), note the following:
  - a. The gear assembly is not square in the case, which may be due to the incorrect seating of a bearing.
  - b. The housing may be deformed.
8. To correct the gear backlash, refer to **Figure 30** and note the following:
  - a. If gear backlash is less than the desired specification, reduce the thickness of the left shim and increase the thickness of the right shim.
  - b. If gear backlash is greater than the desired specification, reduce the thickness of the right shim and increase the thickness of the left shim.

#### NOTE

When adjusting shim thickness, adjust the sides equally. For instance, if the right shim is increased 0.10 mm (0.004 in.), decrease the left shim 0.10 mm (0.004 in.). Changing a shim thickness by 0.12 mm (0.005 in.) will change backlash 0.06 mm (0.002 in.).

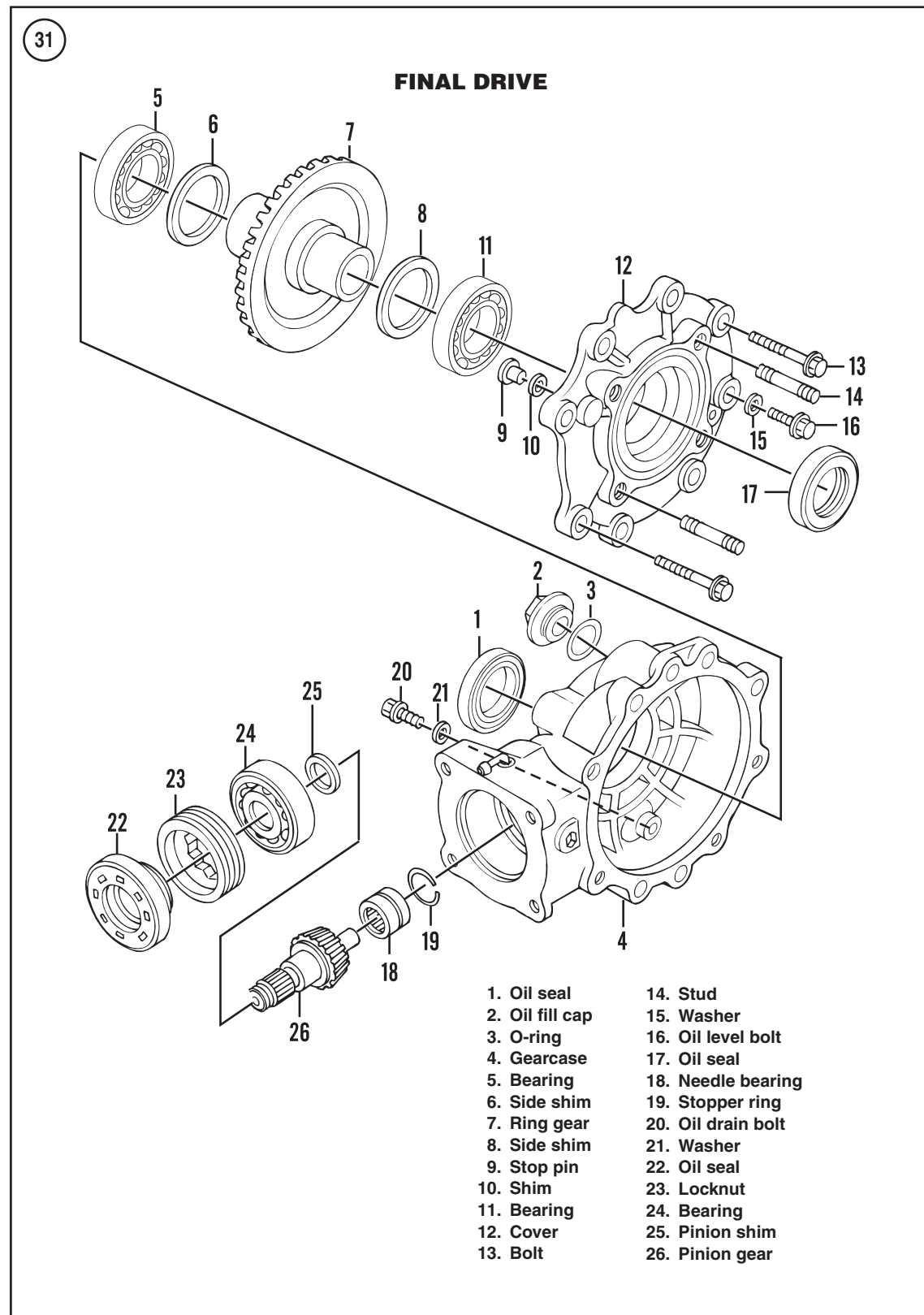
### Disassembly

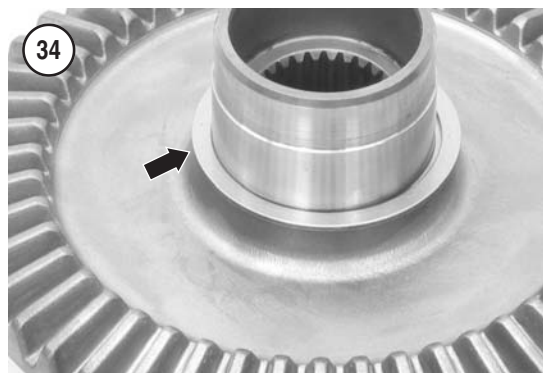
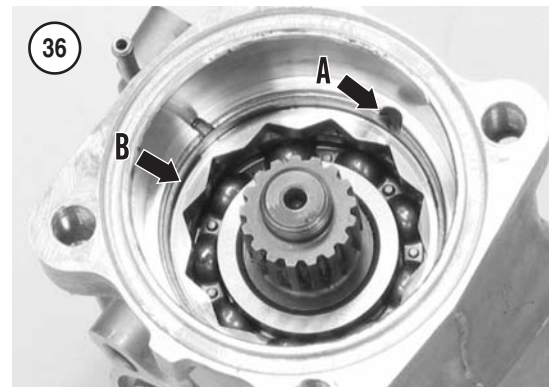
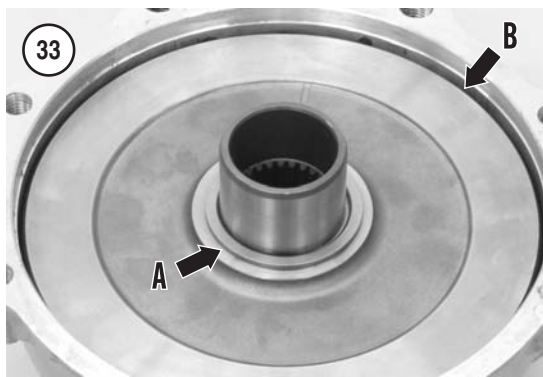
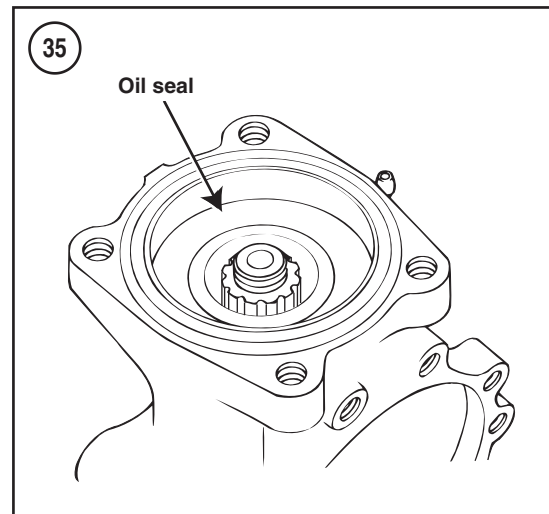
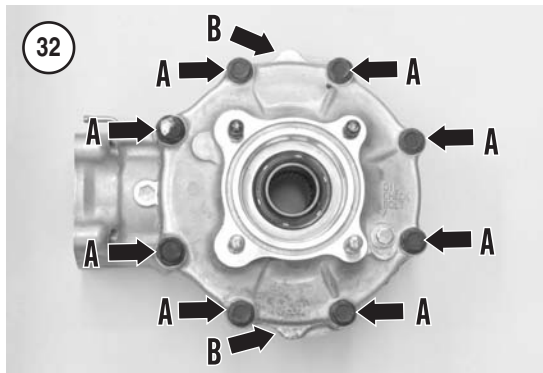
The rear final drive unit requires a number of special tools for disassembly, inspection and reassembly. The price of these tools could be more than the cost of most repairs performed at a dealership. Read the procedure and determine the cost before undertaking the repair.

If the pinion gear, ring gear, gearcase, case cover, side bearings or pinion shaft bearing are replaced, perform the backlash and gear mesh pattern adjustments prior to disassembly.

Refer to **Figure 31**.

1. Remove the cover retaining bolts in a crossing pattern (A, **Figure 32**).
3. Insert a prying tool in the gaps between the gearcase and cover (B, **Figure 32**), and pry the cover off the gearcase.
4. Note the left-side shim on the ring gear (A, **Figure 33**). Remove the shim, label it and set it aside.
5. Remove the ring gear (B, **Figure 33**).





6. Note the right-side shim on the ring gear (**Figure 34**). Remove the shim, label it and set it aside.

7. Using a suitable seal puller, remove the oil seal (**Figure 35**).

8. Rotate the pinion shaft and check for noisy or rough pinion bearings.

#### NOTE

*Cover the internal parts when unstaking the locknut in Step 9 to prevent the entry of metal debris.*

9. Using a grinder or metal removal tool, remove the staked portion of the locknut (A, **Figure 36**).

10. Using the locknut wrench (Honda part No. 07916-MB00002) or an equivalent, remove the locknut (B, **Figure 36**).

11. Assemble the following tools as shown in **Figure 37**, and remove the pinion and bearing assembly.

- Pinion puller base (Honda part No. 07HMC-MM80011A).
- Puller shaft (Honda part No. 07931-ME4010B).
- Adapter (Honda part No. 07YMF-HN4010A).
- Special nut (Honda part No. 07931-HB3020A).

#### Inspection

1. Clean, then inspect, all components for excessive wear and damage. Carefully remove gasket



material from the mating surfaces on the final drive cover and gearcase.

2. Remove the oil seals in the final drive gearcase and cover using a suitable seal removal tool. Install a new oil seal so the closed side is out (**Figure 38**).

3. Turn the bearings (A, **Figure 39**) in the final drive gearcase and cover by hand. The bearings should turn freely and without any sign of roughness, catching or excessive noise. Replace the damaged bearings as described in *Basic Service Methods* in Chapter One. The bearing must bottom in the gearcase or cover bore.

4. Inspect the ring gear and hub (**Figure 40**). Inspect the gear teeth, splines and seal running surfaces on the hub. Replace them if they are excessively worn or damaged.

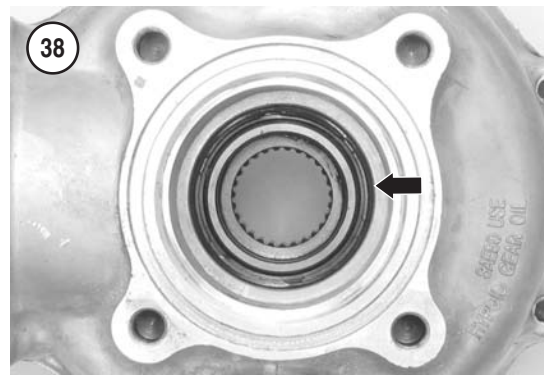
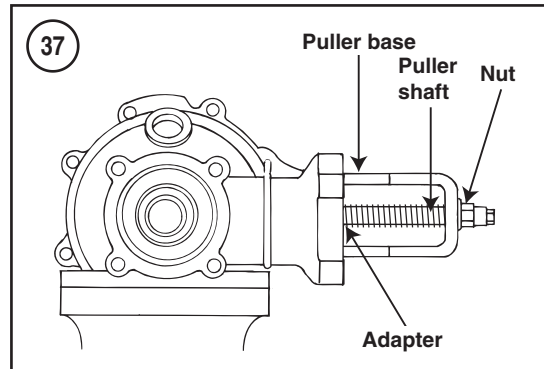
5. Inspect the pinion needle bearing (A, **Figure 41**) in the gearcase. If it is damaged, replace the bearing using the following procedure:

- a. Using needlenose pliers, extract the wire retainer ring (B, **Figure 41**) through the access hole. Rotate the ring so the end is accessible, pry out the end and pull out the ring.

#### CAUTION

*Do not use a flame to heat the gearcase; it can warp the gearcase.*

- b. Heat the gearcase in an oven to 176° F (80° C) and extract the bearing.
  - c. Install a new wire ring into the groove on the outside of the new bearing.
  - d. Install the bearing into the ring compressor tool (Honda part No. 07YME-HN4010A).
  - e. Place the compressor tool with the bearing into a freezer for at least 30 minutes.
  - f. Heat the gearcase in an oven to 176° F (80° C).
  - g. Position the compressor in the gearcase and drive the bearing into the gearcase. Only one blow should be required. Multiple blows may dislodge the wire ring, which will require the installation of a new ring and bearing. Make sure the wire ring is properly positioned as viewed in the access hole (B, **Figure 41**).
6. Inspect the pinion gear and bearing. If the bearing must be replaced, replace it as follows:
- a. Using a press or puller, remove the bearing from the pinion shaft.
  - b. If only the bearing is being replaced, use the original shim on the pinion shaft. If the final



drive cover or housing, ring and pinion gears, or the side bearings are being replaced, install a 2.0 mm (0.79 in.) thick shim as a starting point for the gear position adjustments.

- c. Press or drive the new bearing onto the pinion shaft so the marked side of the bearing is toward the threaded end of the shaft.
7. Check the ring gear side clearance using the following procedure:
- a. Install the ring gear and side shim into the cover.



- e. Drive the stop pin into the cover and recheck the clearance.

### Assembly

Refer to **Figure 31**. Install the bearings and oil seals as described in *Inspection*.

#### NOTE

*Lubricate all moving parts with SAE 80 hypoid gear oil.*

1. Install the pinion gear and bearing into the gearcase.

#### NOTE

*The torque wrench attachment point on the Honda tool specified in Step 2 increases wrench leverage. The actual tightening torque is 98 N•m (72 ft.-lb.).*

2. Install the locknut (B, **Figure 36**). Using the locknut wrench (Honda part No. 07916-MB00002), tighten the locknut to 89 N•m (66 ft.-lb.) as indicated on the torque wrench.

#### NOTE

*Do not stake the locknut when performing the gear mesh pattern check in Step 3.*

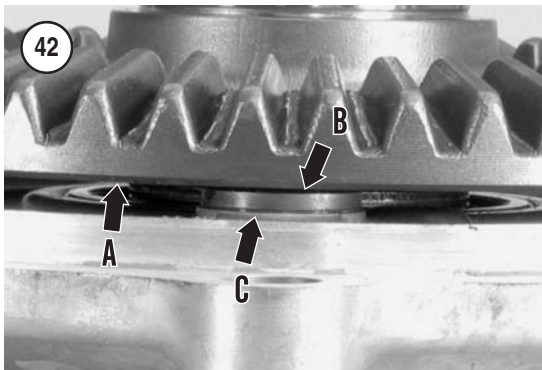
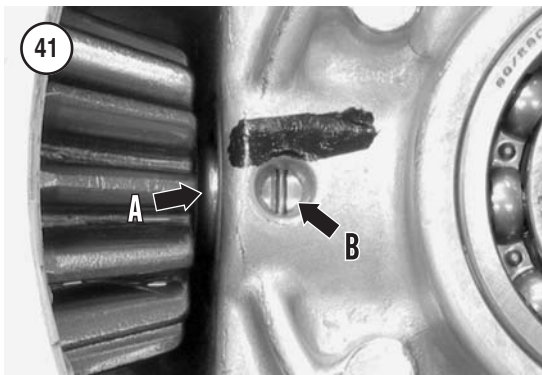
3. If the pinion, ring gear, bearings, gearcase or cover have been replaced, check gear mesh pattern using the following procedure:

- a. Apply Prussian Blue or another gear marking compound to the ring gear teeth.
- b. Install the side shims (6 and 8, **Figure 31**) onto the ring gear, then install the ring gear into the gearcase.
- c. Install the cover onto the gearcase.

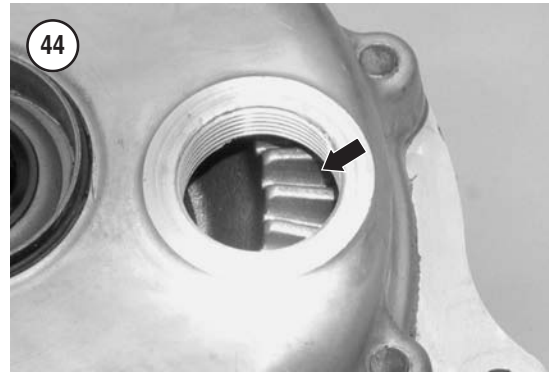
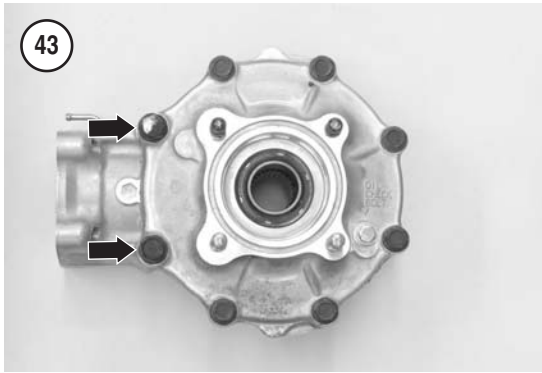
#### NOTE

*While tightening the cover bolts in substep d, rotate the pinion shaft.*

- d. Install the cover bolts. Install the two 10 mm bolts in the locations shown in **Figure 43**. Tighten the bolts evenly in a crossing pattern in several steps until the cover is seated on the gearcase. Tighten the 8 mm bolts to 25 N•m (19 ft.-lb.). Tighten the 10 mm bolts to 49 N•m (36 ft.-lb.).
- e. Remove the oil fill cap.



- b. Using a feeler gauge, measure the clearance between the ring gear (A, **Figure 42**) and the stop pin (B). Refer to **Table 1** for the recommended clearance. The shim (C, **Figure 42**) under the stop pin is used to adjust the clearance.
- c. To adjust the clearance, heat the cover in an oven to 176° F (80° C). Remove the stop pin (B, **Figure 39**).
- d. Install or remove shims as necessary to obtain the desired clearance.

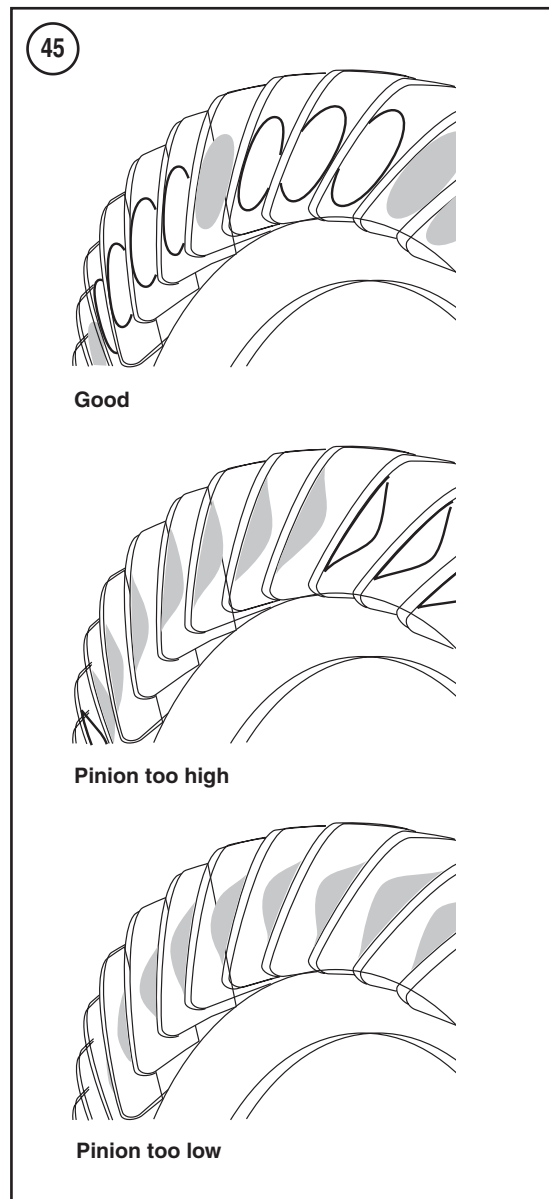


- f. Rotate the pinion shaft several rotations so a pattern is evident on the ring gear teeth. View the ring gear teeth through the gearcase oil fill hole (**Figure 44**).
  - g. Refer to the typical gear patterns in **Figure 45**. If the pinion is low, install a thinner pinion shim (25, **Figure 31**). If the pinion is high, install a thicker shim. The pinion and bearing must be removed to replace the shim. Changing shim thickness 0.12 mm (0.005 in.) moves the contact pattern approximately 0.5-1.0 mm (0.02-0.04 in.).
  - h. Reinstall the pinion gear and bearing, if they were removed, as described in Steps 10 and 11.
  - i. After obtaining a satisfactory gear contact pattern, check the gear backlash.
  - j. Remove the cover and continue with the final assembly procedure.
4. Stake the pinion locknut (A, **Figure 36**) into the notch in the gearcase.
  5. Install the oil seal (**Figure 35**) so it is bottomed. Lubricate the oil seal lips with grease.
  6. Install the side shims (6 and 8, **Figure 31**) onto the ring gear.
  7. Install the ring gear into the gearcase.
  8. Apply a liquid sealant, such as Yamabond No. 4, to the mating surface of the final drive cover, then install the cover onto the gearcase.

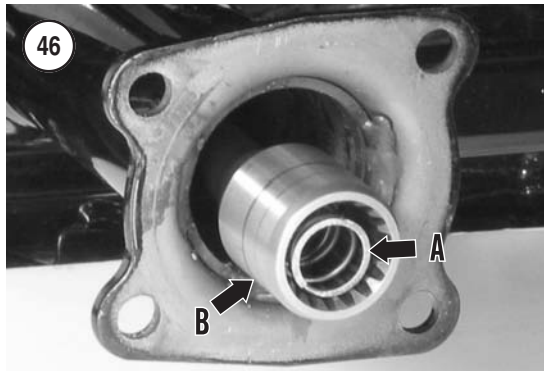
**NOTE**

*While tightening the cover bolts in Step 9, rotate the pinion shaft.*

9. Install the cover bolts. Install the two 10 mm bolts in the locations shown in **Figure 43**. Tighten the bolts evenly in a crossing pattern in several steps until the cover is seated on the gearcase. Tighten the







8 mm bolts to 25 N•m (19 ft.-lb.). Tighten the 10 mm bolts to 49 N•m (36 ft.-lb.).

10. Make sure the gears rotate freely without binding.

## DRIVESHAFT

### Removal/Inspection/Installation

1. Remove the final drive unit as described in this chapter.
2. Remove the spring in the end of the driveshaft (A, **Figure 46**).
3. Remove the driveshaft (B, **Figure 46**).
4. Inspect the splines and seal contact surface on the driveshaft (**Figure 47**). Replace the driveshaft if it is excessively worn or damaged.
5. Before installation, apply molybdenum disulfide grease to the splines of the driveshaft.
6. Insert the driveshaft into the splines of the universal joint. Make sure the driveshaft is fully seated in the universal joint.
7. Install the spring into the end of the driveshaft (A, **Figure 46**).

8. Install the final drive unit as described in this chapter.

## SWING ARM

Bearings are pressed into both sides of the swing arm. Seals are installed on the outside of each bearing to prevent dirt and moisture from entering the bearings. Refer to **Figure 48**.

### Special Tools

The Honda swing arm locknut wrench (part No. 07908-4690003 [A, **Figure 49**]) and a 17 mm hex socket (B) are required to remove and install the swing arm.

### Removal

1. Remove the rear fender (Chapter Fifteen).
2. Remove the final drive unit and driveshaft as described in this chapter.
3. Remove the breather tubes from their clamps on the swing arm.
4. Support the rear of the swing arm, then remove the lower shock absorber mounting bolt (**Figure 50**).
5. Grasp the rear end of the swing arm and try to move it from side to side in a horizontal arc. There should be no noticeable side play. If play is evident and the pivot bolts are tightened correctly, replace the swing arm bearings.
6. Loosen the swing arm boot clamp (A, **Figure 51**) and work the boot off the swing arm.

### NOTE

*It may be helpful to remove the rear brake pedal for greater tool access.*

7. Remove the pivot cap (B, **Figure 51**) from each side of the swing arm.
8. Loosen and remove the right pivot locknut using the locknut wrench (**Figure 52**).
9. Using the 17 mm hex socket, remove the pivot bolts (**Figure 53**) on both sides.
10. Remove the swing arm.
11. Remove the universal joint (A, **Figure 54**) if it did not come off with the swing arm.
12. If necessary, loosen the remaining clamp and remove the boot (B, **Figure 54**).

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